

# Course Planning Guide

for

Bachelor of Science in Engineering (BSE) entered 2017 or later

41 CU TOTAL

COURSE SELECTION			
MATH (4 CU)	ENGINEERING (15 CU)	TECH ELECTIVES (4 CU)	SSH (7 CU)
<input type="checkbox"/> MATH 1400 <input type="checkbox"/> MATH 1410 <input type="checkbox"/> MATH 2400 <input type="checkbox"/> MATH 2410	<input type="checkbox"/> ENGR 1050 <input type="checkbox"/> CBE 1600 <input type="checkbox"/> CBE 2300 <input type="checkbox"/> CBE 2310 <input type="checkbox"/> CBE 3500 <input type="checkbox"/> CBE 3510 <input type="checkbox"/> CBE 3530 <input type="checkbox"/> CBE 3600 <input type="checkbox"/> CBE 3710 <input type="checkbox"/> CBE 4000 <input type="checkbox"/> CBE 4100 <input type="checkbox"/> CBE 4510 <input type="checkbox"/> CBE 4590 <input type="checkbox"/> CBE _____ <sup>c</sup> <input type="checkbox"/> CBE _____ <sup>c</sup>	<input type="checkbox"/> ENGINEERING _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> CBE 4800 <sup>e</sup> or CHEM 2230 or CHEM 2425	<input type="checkbox"/> SS _____ <input type="checkbox"/> SS _____ <input type="checkbox"/> H _____ <input type="checkbox"/> H _____ <input type="checkbox"/> SS or H _____ <input type="checkbox"/> SS or H or TBS _____ <input type="checkbox"/> SS or H or TBS _____
NATURAL SCIENCE (8-9 CU)			
<input type="checkbox"/> CHEM 1012 <sup>a</sup> <input type="checkbox"/> CHEM 1101 <input type="checkbox"/> CHEM 1022 <input type="checkbox"/> CHEM 1102 <input type="checkbox"/> PHYS 0140 or PHYS 0150 <sup>b</sup> <input type="checkbox"/> PHYS 0141 or PHYS 0151 <sup>b</sup> <input type="checkbox"/> CHEM 2210 or MSE 2210 <input type="checkbox"/> CHEM 2410 <input type="checkbox"/> CHEM 2420 or CHEM 2510 or CHEM 2425		<b>NOTES:</b> <sup>a</sup> Please see * CHEM on reverse <sup>b</sup> 0150/0151 exempts student 1 TECH ELEC <sup>c</sup> CBE 3000+ <sup>e</sup> CBE 4790 is pre-requisite	<input type="checkbox"/> <b>Depth</b> (from SSH) <input type="checkbox"/> <b>Writing req't</b> (from SSH) <input type="checkbox"/> <b>Ethics req't/ EAS 2030</b>
			FREE ELECTIVES (3 CU)
			<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____

SEMESTER PLANNING				
TERM	MATH & NAT SCI	ENGINEERING	COMP & TECH ELEC'S	SSH & FREE ELEC'S
Fall ____				
Spring ____				
Summer ____				
Fall ____				
Spring ____				
Summer ____				
Fall ____				
Spring ____				
Summer ____				
Fall ____				
Spring ____				
Summer ____				

CORE COURSE TITLES			
CBE 1500 - Fund. of Biotechnology	CBE 3500 - Fluid Mechanics	CBE 3710 - Separ. Processes	CBE 4590 - Process Sys. Design Prjcs.
CBE 1600 - Intro to Chemical Eng.	CBE 3510 - Heat & Mass Trans.	CBE 4000 - Intro to Product Design	CBE 4790 - Biot. & Biochem. Eng
CBE 2300 - Mat. & Energy Balances	CBE 3530 - Adv. Chem. Eng. Sci	CBE 4100 - Chem. Eng. Lab	CBE 4800 - Lab in Biot. & Gen. E
CBE 2310 - Thermod. of Fluids	CBE 3600 - Chem. Proc. Ctrl.	CBE 4510 - Chem. Reac. Design	

## OTHER COURSE TITLES

CHEM 1101 - Intro Chem Lab I	CHEM 2420 - Principles of Orgo II	MATH 1410 - Calculus II
CHEM 1102 - Intro Chem Lab II	CHEM 245 - Experimental Orgo I	MATH 2400 - Calculus III
CHEM 1012 - General Chem I	CHEM 2510 - Prin. of Biological Chemistry	MATH 2410 - Calculus IV
CHEM 1022 - General Chem II	CIS 1100 - Intro. to Comp. Prog. (w/ Java)	PHYS 0140/0150- Princ of Phys I/wLab
CHEM 2210 - Physical Chemistry I	CIS 1200 - Prog. Languages & Techniques	PHYS 0141/0151 - Princ of Phys II/wLab
CHEM 2230 - Experimental P. Chem I	ENGR 1050 - Intro. to Scientific Computing	CHEM 243 -Orgo II:Orgo for Biomed.
CHEM 2410 - Principles of Orgo I	MATH 1400 - Calculus I	

## THE WRITING REQUIREMENT

Students are strongly encouraged to fulfill the Writing Requirement during the first two years of study because it becomes increasingly difficult to schedule first-year courses as one moves through the curriculum.

The Writing Requirement differs somewhat between each of the four undergraduate schools at Penn. For Penn Engineering students, the requirement can be satisfied by taking a course with the prefix **WRIT**.

## SOCIAL SCIENCE AND HUMANITIES COURSES

**The depth requirement:** a student should choose courses of personal interest which will provide in-depth study (two or more courses) of at least one subject in any SSH category.

**Approved Social Science (SS) Departments:**

Asian American Studies<sup>1</sup>, Communications, Criminology, Economics<sup>2</sup>, GSOC, Health and Societies, International Relations, Linguistics<sup>3</sup>, PP&E, Political Science, Psychology<sup>2</sup>, Sociology<sup>2</sup>, Science Technology and Society, Urban Studies, Women's Studies

**Approved SS Courses Offered outside of SAS:**

CIS 355, 590; EAS/BE 303; LGST 101, 210; FNCE 101, 103; BPUB 201, 250; NURS 333, 533

**Approved Humanities (H) Departments and Courses:**

African Studies, Africana Studies, Anthropology, Ancient History, Architecture<sup>4</sup>, Art and Archeology of the Mediterranean World, Art History, Asian American Studies<sup>5</sup>, Cinema Studies, Classical Studies, Comparative Literature and Literary Theory, East Asia Languages and Civilizations, English, Fine Arts, Folklore, Germanic Languages, History, History and Sociology of Science, IPD, Jewish Studies, Latin American and Latino Studies, Music, Near Eastern Languages & Civilizations, Philosophy<sup>6</sup>, Religious Studies, Romance Languages, Slavic Languages, South Asia Studies, Theatre Arts. Additionally, any foreign language course and any of the following courses will fulfill this requirement: CIS 106; EAS 009, 200, 310.

**Approved Substitutions:**

Up to two SSH courses may be substituted from the "**Technology in Business and Society**" course category.

These are limited to: **BE** 280, 503; **CIS** 125, 355, 590; **EAS** 9, 125, 280, 345, 346, 348, 349, 400, 401, 402, 445, 446, 448, 449, 500, 502, 548; **IPD** 549, **MEAM** 399, and **MSE** 266.

## TECH ELECTIVES

Technical Electives must be chosen from Math, Natural Science, or Engineering courses (NOT EAS). Any course not chosen from these categories must be approved by petition.

\* CHEM continued from front: EAS 091 is acceptable in this department, but it is not equivalent to CHEM 101. Therefore, pre-med students or students who might transfer out of CBE will still need CHEM 101 credit. We highly recommend taking the placement test regardless.

<sup>1</sup>unless cross-listed w/AMES, ENGL, FNAR, HIST, or SAS; <sup>2</sup>except stats., probability, & math courses; <sup>3</sup> except language courses

<sup>4</sup>Design of the Environment; <sup>5</sup>cross-listed with AMES, ENGL, FNAR, HIST, or SAS **only**; <sup>6</sup>except logic courses 005 & 006